Working Paper Series

SOME PRELIMINARY EVIDENCE ON FAMILY INCOME CONCENTRATION IN ONTARIO

Harry M. Kitchen*

June, 1975

Ontario Economic Council
Toronto, Ontario

SOME PRELIMINARY EVIDENCE ON FAMILY INCOME CONCENTRATION IN ONTARIO

Harry M. Kitchen*

June, 1975

Working Paper No. 1/75

*While the author is solely responsible for all errors or omissions he is indebted to Frank Fedyk, Irene Ip, Bruce Rayfuse, Bill Waiser and two referees for helpful and incisive comments on an earlier draft. Funds in support of this project were provided by the Ontario Economic Council, but this is not to imply that they necessarily agree with or support the analysis or conclusions in this paper.

Introduction

Within the past forty years the governmental system has tended to assume an increasing responsibility in the area of income distribution. And with greater government involvement, the topic has naturally become the focus of a great many studies and debates.

There are essentially three types of economic studies which have been undertaken on the distribution of income. The first type of study has been primarily concerned with the determination of the distributive share of income (5,6). The second type of study, a relatively new one, deals with the theory of human capital (4). Although the economic theory underlying this approach initially appears sound, further investigation suggests that it suffers from data deficiencies, and poses certain analytical problems, encountered when attempting to apply the theory of human capital to income distribution (26). The third type of study, and the one with which we are concerned in this paper, is the measurement of a number of socio-economic factors and their relative impact on the inequality in the distribution of family income.

Ideally, one would like to develop an economic model consisting of a set of structural relationships based on consistent economic behaviour of certain economic agents.

One particular approach could start by measuring the determinants of the regional dispersion of economic activity. Here, one could turn to the traditional analysis of location theory and international trade which focuses on differences in resource endowments, tastes, technology, on factor mobility, transport costs, increasing returns to scale, etc. Following this one could analyze the effects of such patterns of economic activity on the patterns of inequality. The theory for this would be based on life cycle models of economic behaviour and effects of decisions concerning occupational choice, savings, human capital investment, etc., and the predictions these theories would produce concerning the effects of differences in age structure, industrial structure, etc., on the amount of inequality.

To accomplish all of the above, of course, would be a rather large task and one which was beyond the scope of this paper. Instead, this study, as the title states, is a preliminary exploration of the relationship between certain socio-economic variables and the concentration of census family income (1) in all urban centres in Ontario with a population in excess of 10,000 for the year 1971. While the theory underlying the justification of variables included in a study of this nature is largely speculative, the empirical work to date (2,3,7,10,12,13,19,20,21,27,28) has suggested the importance

of several variables in explaining the variation in income inequality across various spatial units. The primary purpose of this paper is to extend these results in a number of important areas. First, very little of any substance has been done in Canada on the distribution of family income in a small geographical area. Thus, the results of such an undertaking will permit comparison with similar studies in other countries. Second, this type of study is useful in measuring the relative significance of a number of socio-economic factors upon the inter-urban distribution of family incomes. Third, if one of the objectives of government policy is to provide a more equitable distribution of income, such a study will represent a possible source of areas for further investigation. Fourth, the empirical results of this study should provide some information for others contemplating further theoretical or empirical work on income distribution.

A review of the literature indicates that a number of studies on income distribution have been undertaken over the past few years. Some have been concerned with international comparisons of income inequality(13,21), while others have been primarily concerned with explaining the concentration of

1 A census family consists of a husband and wife (with or without children who have never been married, regardless of age) or a parent with one or more children never married living in the same dwelling. 1971 Census of Canada, Families, Catalogue 93-716, Statistics Canada, Ottawa, 1973.

income in smaller spatial areas. Within this latter group, we find various American studies attempting to analyze the interstate differences in income concentration (2,3,7,27). Fewer studies have been attempted on smaller spatial units; for example, Farbman (10) has attempted to measure the concentration of income on a county-by-county basis in twelve southern American states. Barbara Murray (20) employed the fifteen largest SMSA's as her unit of observation. Although, the units of observation (states versus SMSA's versus counties) have differed, the approach has been very similar, being basically an attempt to measure the relative importance of a number of independent variables, which were felt to have some significant impact on the concentration of income.

The study which we have undertaken adopts, with modifications where necessary, the approach established by a number of the afore-mentioned authors. It is similar in that we employ a multiple linear regression analysis in order to estimate the importance of a number of independent variables which are felt to affect the concentration of income. It is different in that it concentrates on one region in Canada, specifically Ontario and within that region it attempts to analyze the factors affecting income inequality in all cities and towns with populations in excess of 10,000 for the year 1971. Although there is no clearly defined rationale for choosing a specific geographical area or spatial unit as the unit of observation, it was felt that the obvious advantage of choosing cities and towns within one province is that it

would indicate the relative significance of the various factors affecting the internal diversity which exists in a specific region, a point that has neither been carefully nor clearly analyzed in previous studies. Moreover, the choice of cities and towns rather than census divisions was made on the premise that the residents of these urban centers are governed by one local council (in addition to federal and provincial governments) whereas, census divisions cannot, by and large, claim this degree of uniformity. There may be different local governments with different policies ruling in one census division, a factor which would provide an element of diversity which we are attempting to hold constant in this study. As well, Kuznets (14) argues that the distribution of income is different in rural than urban areas. Thus, if one includes both urban and rural a large amount of the variation in income distribution might be captured by incorporating a variable reflecting the urban/rural mix. In order to avoid this problem, we decided to test our model on urban centers only. A further advantage of this kind of approach is that a number of variables can be held fairly constant over the entire region; for example, the provincial government under the British North America Act is responsible for the provision of education throughout the entire area under study. Thus, the decisions made with regard to the quality and extent of

educational services provided would not be expected to have a significant bearing on the intra provincial differences in income concentration. As well, the same legislation with respect to sales taxes, corporation and personal income taxes applies throughout the entire region. Resource endowment will not vary as much in one province as in a larger geographical area. In short, a number of factors which may have an important bearing on the interprovincial concentration of income can be held constant allowing us to concentrate on the variables affecting the internal diversity within one specific area.

Finally, in this study we have opted to use family incomes (as opposed to individual incomes) since the members of a family group generally attempt to maximize the welfare of the total group rather than that of any individual in the group. Frequently, the family group is the only real connection which they have with the economic world.

Dependent and Independent Variables

In the light of the above comments, it is suggested that the concentration of family income can be explained on the basis of the following linear regression model:

$$Y = a + B_1X_1 + B_2X_2 + \ldots\ldots B_nX_n + u \qquad (1)$$

where Y represents the degree of income inequality as measured by the Gini coefficient; X_1, X_2 ..... X_n are the independent variables; a is the constant and B_1, B_2 .....B_n are the net regression coefficients; and u represents random variation.

Obviously, then, the choice of the dependent and independent variables is central to our analysis of income concentration. For our dependent variable (Y) we have chosen Gini's concentration ratio[2] of family income in each center as our proxy measure for the size distribution of income. Admitting that this is not the only measure, nor necessarily the best measure since it suffers from a problem in that various shaped income distributions yield the same Gini coefficient, it has nevertheless been usefully employed in a number of similar studies (2,3,10,12,14,27). Other measures such as the interquartile variation (20), the upper quintile, or decile, and the coefficient of variation all suffer from the basic problem that they measure only the variation in income concentration within a specific range and do not take into consideration the entire distribution.

2 This index of income inequality is derived from the Lorenz Curve. The Lorenz Curve is obtained by plotting the cumulative percent of family income earners (along the horizontal axis) against the cumulative percent of aggregate income (along the vertical axis). The index of income inequality is defined as the ratio of the area between the diagonal (line of equality) and the Lorenz Curve to the total area under the diagonal. The index of inequality ranges from 0.0 to 1.0. As the index approaches zero, the less will be the income inequality or the greater will be the degree of income equality. See Morgan (19) for a description of the method of calculating the Gini coefficients. Data for this variable were obtained by special request from Statistics Canada. The income distribution in each center was broken down into 17 intervals and data were supplied on the average income per interval along with the number of families receiving income in each respective interval.

For example, Kuznets (14, p.1) argues that "the distribution should be complete, i.e., should cover all units.....rather than a segment either at the upper or lower tail". Finally, the selection of the Gini coefficient allows one to make some comparisons with other studies which have been completed on various spatial units.

The independent variables (X_1, ...X_8), designed to capture a number of important economic effects, were chosen on the basis of previous empirical research and knowledge of special conditions prevailing in the province of Ontario. First, it is hypothesized that the median income[3] (X_1) of a centre will have a negative but statistically significant effect on the concentration of income. Since, for most families, the main source of income is from employment, a relatively high median income for a community will generally mean that there is a relatively high level of employment in high-wage industries. In this sense, the average[4] income of a region is, as Farbman (10) and others (2,14,31) suggest, a proxy for the level of economic development of that area. An increase in the level of median income will most likely come about as a result of the establishment of new industries in the area, or as a result of the expansion of existing industries. The raised

3 Median income was estimated from the income distribution data supplied by Statistics Canada.

4 Most studies employ mean income rather than median income as one of their independent variables. Our choice of median income is based on the fact that the income distribution is skewed and hence median income is a better measure of central tendency than is mean income.

level of median income is a product of the increase in employment induced by the expansion. As the pool of unemployed from which employers can draw is reduced, higher wages must be offered so as to induce voluntarily unemployed labour to give up leisure time in favour of work and to bid away labour from other employers. In line with this general upward movement there has been a tendency towards clustering at middle income levels (11). Thus, it would be expected that as median income rises and as a central tendency begins to appear, the statistic measuring the degree of income inequality should decrease.

Second, the female participation rate (X_2)[5] in each city and town is expected to affect significantly the city or town's observed income distribution. A high female employment to population ratio implies more multiple earner-families and/or fewer families with no income earners hence higher family incomes. Consequently, fewer families will fall at the lower end of the income distribution biasing the inequality statistic upwards. Our hypothesized result then is that the higher the female participation rate, the lower the degree of income inequality (or the higher the degree of equality).

5 The variable was calculated by dividing females in the labour force in age group 15-65 by total population aged 15-65. Statistics were obtained from unpublished data (at time of writing), Census of Canada, 1971, "Individuals 15 Years and Over, Labour Force Activity by Level of Schooling, by Sex, and by Age Groups", Information Canada, Ottawa, 1974.

The third variable reflects the ethnic composition of the population (X_3)[6]. The rationale for including such a variable is essentially two-fold. On the one hand it may be that certain ethnic or racial groups are discriminated against in the job market (13), and this discrimination may be manifested in the economic circumstances of those groups. Studies in the United States (2,3,7,27), for example, have found that discrimination against non-whites is a major source of income inequality in a community. On the other hand, it is possible that particular groups tend to possess certain social and cultural characteristics which virtually relegate them to certain jobs and certain income levels. If, for example, an immigrant is from a poor non-English speaking country, he is likely to have little in the way of occupational or educational skills, as well as little proficiency in English. As a result, one would expect that he would have some difficulty finding a high paying job.

In our study, these tendencies were attributed to three different groups. First, we included all those whose language most often spoken at home was not English.[7] The rationale for

6 Data were obtained from Census of Canada, 1971, "Population: Official Language and Language Most Often Spoken at Home, Catalogue 92-726", Information Canada, Ottawa, 1973.

7 "Language most often spoken at home" refers to the language used most frequently by the person in his or her home. Where as "mother tongue" (the language a person first learned in childhood and still understands) or "official language" (able to speak either one or both of the official languages of Canada) could have been substituted for the language barrier, the former was found to be statistically the most significant in addition to supporting the strongest rationale.

selecting this group was simple: the language barrier captures those individuals who would likely have a limited facility in English and would therefore have a more difficult time finding higher paying positions of responsibility. Second, we included Native Indians who for various reasons - including generally low levels of education and training - seem to be particularly ill-equipped for life in urban areas and participation in modern job markets (16, pp. 121-124). Third, in an attempt to ascertain whether a "colour barrier" might exist in Canada, as it appears to in the United States, Negroes and West Indians were included in the supposedly underprivileged or discriminated against groups.[8] We would thus expect a direct relationship between the Gini coefficient and the percentage of people falling within these groups in each city or town.

8 Further variables on the ethnic composition were tested; for example, we included in our discriminated group French Canadians, Italians, Native Indians, Hungarians, Negroes and West Indians. The rationale for selecting this group was based on two factors. First, The Real Poverty Report (1, p. 72) featured a table showing the income of salaried males in fourteen ethnic groups in Quebec. On an earnings index with a base or average equal to 100, three ethnic groups were below 100, and included in our discrimination variable; French Canadians, Italians, Native Indians. In addition, one other group was marginally above the 100 mark - Hungarian - and was also included. As well, to test the colour barrier we included Negroes and West Indians. A slightly different ethnic variable based on work completed by John Porter (24, pp. 74-76) could have been incorporated in our study. He ranked the various ethnic groups according to five occupational categories. However, it was our feeling that Porter's ethnic variable based on 1931, 1951 and 1961 census data was too broad. Finally, we tested the period of immigration as an ethnic variable. The argument follows that the more recent the arrival of an individual, the less facility with the English language and the greater the difficulty of obtaining a higher paying job and hence the greater the degree of income inequality.

The fourth variable, the median age of the labour force[9] (X_4) was included as an attempt to measure a further characteristic of the labour force; for example, median age of the labour force is hypothesized to have a positive relationship with the index of inequality. This situation occurs for a variety of reasons[10] but primarily because the largest source of income consists of wages and salaries and it has been repeatedly observed empirically that earnings profiles fan out with age over the life cycle. As well, this is a standard theoretical implication of the Mincer (18) on-the-job training model of human capital investment.

A further investment variable, namely the percentage of the population over sixty-five (X_5)[11] is expected to yield a significant and positive effect on the size distribution of family income. This variable is an attempt to measure the importance of one extreme in the age distribution. Essentially the argument goes that the families in this category, regardless of whether inside or outside of the labour market, receive

9 This variable reflected the median age of the entire labour force up to the age of 65. Those over 65 in the labour force were excluded so as not to conflict with our variable measuring the percentage of the population over 65. Data were calculated from unpublished (at the time of writing) data, Census of Canada, 1971, "Individuals 15 years and over, Labour Force Activity by Level of Schooling, by Sex and Age Groups", Information Canada, Ottawa, 1974.

10 For example, see Morgan (19).

11 Data were calculated from Census of Canada 1971, "Population: Age Groups, Catalogue 92-715", Information Canada, Ottawa, 1973.

substantially lower incomes.[12] The receipt of such income is primarily attributed to past activity while in the labour market, i.e. their pension or other income is a reflection of prior earnings and investments (or lack of) and is frequently lower than the income earned from employment at an earlier age.

The population[13] (X_6) of each city or town is included in our model not so much for the purpose of testing a specific hypothesis as to merely observe its behaviour in relation to the index of income inequality. It is employed not on the basis of any clearly defined a priori rationale but rather on the suspicion that income inequality may vary according to the size of the city. Hence, we shall test the population rather naively with no preconceived notion of the relationship between this variable and the Gini coefficient.

The occupational structure[14] (X_7) of a city or town is a further important factor in affecting the concentration of family incomes. In Ontario, as in most other counties and

12 For further statistical documentation, see H. Lithwick (16, p. 30)

13 Data were obtained from Census of Canada, 1971, "Population of Urban Centers of 5000 and Over, Catalogue 92-754", Information Canada, Ottawa, 1972.

14 Calculated from unpublished data, Census of Canada, 1971 "Experienced Labour Force by Occupation by Census Subdivisions of Ontario", Information Canada, Ottawa, 1974. The data obtained were extremely detailed and were subsequently collapsed into 23 occupational groupings.

states, there are wide variations in family income depending on the occupation. For example, those occupations with the highest average incomes, namely managerial, medical, teaching and occupations in the natural and social sciences and related fields tend to have wide variations in the distribution of income within each respective category. Similarly, occupations with the lowest average income (farming, fishing, etc.) substantially reflecting the unskilled component of the labour force tend to have wide variations in the level of income earned. On the other hand, the middle income occupations and here we refer to those essentially related to the manufacturing sector[15] tend to show the least amount of variation. In short, we have chosen the percentage of people employed in manufacturing related occupations in each centre as our independent variable. The rationale for this is as follows. The variation in the actual earnings of individuals employed in this occupation tends to

15 The occupations included here refer to those people employed in processing occupations; machining and related occupations; production fabricating, assembly and repair occupations; materials handling and related occupations; and clerical and related occupations, a large percentage of whom are employed in the manufacturing sector. Although one may question the inclusion of all the above-mentioned occupations in our manufacturing variable, data indicates that those not directly in the manufacturing sector earn incomes, because of occupational mobility, which are in line with those in the manufacturing sector. For evidence, on this spillover mechanism, see (28).

Wilbur Thompson (30,pp. 15-16) also supports this argument for he believes that there is a regularity in the pattern of income distribution. He finds a clear tendency for manufacturing districts to show less inequality than non-manufacturing districts. Factory work calls for a relatively narrow range of skills and involves similar levels of effort. As well, the egalitarianism of the Trade Unions has further compressed the wage rate variation within any given industry, thus, he was able to maintain that there exists a tendency towards greater income equality in such diverse places as highly unionized centres of heavy industry.

show the lowest amount of dispersion as measured by the coefficient of variation[16] and, therefore, a high degree of concentration of incomes about the average. Such a situation implies that there will be a relatively low degree of income inequality. In short, the greater the percentage of income earners employed in manufacturing related occupations in the centres in our study, the lower the degree of income inequality.

The eighth and final variable to be included in our model refers to the level of education[17] (X_8) in each centre. Education is generally the vehicle by which an individual qualifies for a more responsible position and enhances his chances of earning a higher level of income. Such a view is supported theoretically by the investment in human capital school (4,18). Essentially, their argument is that the greater the investment in education, the greater the rate of return as evidenced in the higher levels of earnings by the more educated element of the population. Most studies have incorporated the median school years completed as their educational variable (2,3,10,12,27). Although this variable is quite appropriate as an index reflecting the educational achievement amongst counties or states where there are jurisdictional

16 The coefficient of variation is obtained by dividing the standard deviation of the distribution by the mean. The greater the value, the greater the dispersion of the individual values about the mean.

17 Data were calculated from Census of Canada, 1971, "Population by School Attendance and Schooling, Catalogue 92-720", Information Canada, Ottawa, 1974.

differences in the quality and provision of education, it is much less appropriate within one specific region. In Ontario, where the responsibility for education basically lies with the province rather than the city or town, there is considerably less variation in the median years of education of the population[18]. Such a concentration about the median will not yield enough variation to justify its inclusion as an independent variable. On the other hand, there is considerable variation[19] in the percentage of the total population in each centre who have achieved a university degree. In spite of this reasonably large variation, it still remains as a very small percentage of the total population five and over not attending school full-time. Briefly, one can argue that the lower the percentage of people with university degrees, the fewer people earning high incomes and hence the greater the concentration of income (i.e. a more equal distribution of income). However, as this percentage increases, more people begin to earn higher incomes and the degree of income inequality increases. Presumably, as this percentage continues to grow in the future, there will, at some time, be a reversal in this trend leading to a subsequent reduction in the level of inequality.

18 The mean level of education of the population five and over not attending school full time was 10.72 years in 1971 with one standard deviation of .38 years.

19 The variation ranges from 1.89% to 10.34%.

In light of the above comments, one can readily establish an equation for deriving the extent of the variation in the concentration of family incomes in cities and towns in Ontario for the year 1971. This equation is represented as:

$$Y = A - B_1X_1 - B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5 + B_6X_6 - B_7X_7 + B_8X_8 \quad (2)$$

where Y = Gini coefficient (the measure of income inequality)

X_1 = median income

X_2 = female participation rate

X_3 = ethnic composition of the population

X_4 = median age of the labour force

X_5 = population over 65

X_6 = population

X_7 = occupational mix

X_8 = educational variable

A = intercept

$B_1, B_2 \ldots . B_8$ = regression coefficients

Empirical Results

With our previously designed model in mind, it is now possible to test its explanatory powers on the degree of income inequality in urban centres in Ontario. More specifically, our model is tested for 69 cities and towns in Ontario whose population exceeded 10,000 in 1971.[20]

20 These centres also included the five boroughs around Toronto, namely, Scarborough, Etobicoke, York, North York, East York.

Table 1 provides us with information on the values of the various regression coefficients, the standard errors of these coefficients, the t-statistic, the beta coefficients[21] and the partial elasticities for each of the independent variables.

An examination of the individual regression results indicates that all variables except population (X_6), for which a specific sign was not postulated, produced the expected relationship. The t-ratio of two of the independent variables (X_4, X_5) is significant at the five percent level. As well, five of the independent variables (X_1, X_3, X_6, X_7, X_8) are significant at the one percent level. The female participation rate is the only variable in our analysis which proves to be insignificant.[22] The positive sign of the population variable indicates that the degree of income inequality increases as the population of the city or town rises.

21 The beta coefficients are obtained by multiplying the net regression coefficients by the ratios of the standard deviation of the different independent variables to the standard deviation of the dependent variable. By reducing the net regression coefficients to a common denominator, the beta values allow one to rank the independent variables in terms of their importance in explaining the variation in the dependent variables.

22 See Table A-1 in Appendix A which provides a correlation matrix of the dependent and independent variables. From this, one can conclude that our analysis is essentially free of problems of multicollinearity. Table A-2 in the Appendix lists the observed Gini, estimated Gini and the residual as a percentage of the observed for 69 places.

T A B L E 1

Variable	Regression Coefficient	Standard Error of the Regression Coefficient	t-ratio	Beta Coefficient	Partial Elasticities
X_1	-13.28588	2.49114	-5.33**	-.586	-.434
X_2	- .00055	.00099	-0.56	-.054	-.041
X_3	.00048	.00018	2.68**	.236	.020
X_4	.00394	.00164	2.40*	.222	.463
X_5	.00198	.00096	2.06*	.211	.056
X_6	.06492	.01735	3.74**	.312	.016
X_7	- .00111	.00034	-3.25**	-.271	-.139
X_8	.00689	.00138	4.98**	.527	.101

* indicates variables significant at the .05 level (two-tailed test)
** indicates variables significant at the .01 level (two-tailed test)

Intercept = .28545

Coefficient of Multiple Determination = .7333

Adjusted Coefficient of Multiple Determination = .6977

'F' statistic = 20.62 (significant at the .01 level)

Although more than 69 per cent (adjusted for degrees of freedom) of the variation in the size distribution of income can be explained by the previous model, it contained one statistically insignificant variable. After dropping this variable, the model was subsequently reworked yielding the results as outlined in Table 2.

With the gain in degrees of freedom, over 70 per cent of the variation in the inequality of income in cities and towns is explained; again the regression equation is significant at the .01 level. A further examination of the results presented indicates that the t-ratios increased for all independent variables except X_5 which fell marginally.

Even though our model explains 70 per cent of the variations, it appears to have a somewhat lower explanatory power than a number of similar American studies (2,3,10,12,27). Initially, this appears somewhat interesting particularly in view of the fact that our model generally has more significant independent variables than those studies encountered in a review of the literature. However, there are a few explanations which can be provided. First, all the American studies employ the black-white population mix as one of their independent variables. Such inclusion, since the problem of discrimination appears to be much more serious in the United States than in Canada, guarantees a model yielding a higher explanatory power. Second, virtually every study, the exception being Farbman (10), on income distribution is based on an analysis of interstate or intercountry variations. Such differences in income

T A B L E 2

Variable	Regression Coefficient	Standard Error of Regression Coefficient	t-ratio	Beta Coefficient	Partial Elasticities
X_1	-13.40567	2.46090	-5.45**	-.592	-.438
X_3	.00050	.00017	2.92**	.248	.021
X_4	.00432	.00147	2.93**	.244	.508
X_5	.00178	.00088	2.02*	.189	.050
X_6	.06151	.01611	3.82**	.296	.016
X_7	- .00118	.00032	-3.74**	-.287	-.148
X_8	.00673	.00134	5.01**	.516	.099

* indicates variables significant at the .05 level (two-tailed test)
** indicates variables significant at the .01 level (two-tailed test)

Intercept = .26621

Coefficient of Multiple Determination = .7334

Adjusted Coefficient of Multiple Determination = .7028

'F' statistic = 23.97 (significant at the .01 level)

distribution will be easier to explain particularly since a number of factors which cause obvious inequalities vary from state-to-state or country-to-country; for example, legislation with respect to minimum levels and quality of education varies from one region to the next; laws relating to sales, personal and corporate income taxes will vary from one area to another; and even such factors as attitudes towards racial discrimination, governmental intervention in the level of economic activity, etc. will be different in different states or countries.[23] In short, then, one of the basic advantages of our model is that we have been able to hold most of these factors constant while attempting to evaluate the factors causing the degree of income inequality to vary within cities and towns in one specific province or region.

Before leaving an analysis of our statistical results a few further comments on our independent variables are in order. While one may find seemingly reasonable alternative measures of some of these variables, it is our belief based on existing data that the statistical results will be, at the most, marginally altered. For example, if one were to substitute the various ethnic variables outlined above, one would find, with one exception, a marginally lower but nevertheless significant

23 For an example of regional variation in Canada and its connection with low average income see the Economic Council of Canada, Fifth Annual Review, pp. 104, 111, 128-130, 141-142, Queen's Printer, Ottawa, 1968; and Economic Council of Canada, Eighth Annual Review, pp. 213-15, Information Canada, Ottawa, 1971.

t-statistic.[24] This is what one should expect particularly in light or our earlier comments on the various definitions of what constitutes an ethnic background. Similarly, if one were to change the educational variable to the percentage of people with university and some university, the t-ratio would yield a somewhat smaller but still significant result.[25]

Finally, it is important to consider the significance of the population variable. As mentioned earlier this variable was included in order to assess the variation in the degree of income inequality between large and small centres and it is to this point which we now turn.

Empirical Results of the Sub Models

Table 3 provides a summary of the submodels which were run according to population size of the city or town. Since there appeared to be no intuitive reason for choosing those cities or towns according to some optimal size we opted

24 The t-statistic for the ethnic variable based on the Real Poverty Report (1) is 2.21. Based on Porter's measure (24) the t-statistic is 1.75. Finally, if one substitutes a somewhat different variable, namely the period of immigration, the t-statistic becomes insignificant with a value of .16.

25 The t-statistic falls from 5.02 (Table 2) to 4.57. If you move further and include the percentage of people with a post secondary education, the t-ratio falls to 2.98. These results are exactly what one might expect following the investment in human capital approach. As well we are broadening our group at the extreme and such an exercise given our hypothesis must lead to a lower degree of statistical significance.

for three models, namely i) those under 30,000 (A_1) and those over 30,000 (A_2); ii) those under 50,000 (B_1) and those over 50,000 (B_2); and iii) those under 100,000 (C_1) and those over 100,000 (C_2). While the sample size is small for two of our studies (over 50,000 and over 100,000) and some of these results may have to be interpreted with caution, it is our feeling that such divisions will provide some useful insights which may develop as one notices differences between smaller and larger centres. Perhaps the best way to view our results is to analyze each independent variable in all six models and compare the results with those presented in Table 1 (p. 19). Median income (X_1) which was highly significant in our overall model yields the postulated effect in all six sub-models. As well, it is significant at the .01 level in models A_1, B_1, C_1. Essentially, one notices that median income tends to have a greater impact on reducing the degree of income inequality in smaller than in larger centres.

The female participation rate (X_2) gives us the hypothesized negative effect in all sub-models except for A_1. The results in C_2 indicate a significant relationship between the percentage of females participating in the labour force and the degree of income inequality. The variable reflecting the ethnic composition yields a positive effect in all sub-models even though it is significant in only three of the sub-models.

X_4 (median age of the labour force) provides some interesting results in our submodels. Outside of variable X_2 in A_1, it

TABLE 3

REGRESSION COEFFICIENTS FOR SUB-MODELS

Sub-Models	Variables Included (t-ratios in parenthesis)								$\bar{R}^2$ (sample size in parenthesis)
	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	
A_1 Under 30,000	-15.84388 (-3.51)***	.00022 (.12)	.00041 (1.51)	.00539 (1.93)*	.00138 (.97)	.03441 (.06)	-.00150 (-2.64)**	.00688 (2.33)**	.6683 (34)
A_2 Over 30,000	- 7.93993 (-2.40)**	-.00157 (-1.43)	.00081 (2.78)**	.00096 (.53)	.00309 (1.89)*	.05715 (3.38)***	-.00044 (-1.08)	.00699 (4.65)***	.7556 (35)
B_1 Under 50,000	-14.70674 (-4.31)***	-.00095 (- .66)	.00038 (1.63)	.00354 (1.71)*	.00199 (1.60)	.19306 (.82)	-.00111 (-2.54)**	.00797 (4.17)***	.6641 (44)
B_2 Over 50,000	- 7.65681 (-1.66)	-.00143 (-.91)	.00060 (1.46)	-.00070 (-.24)	.00322 (1.52)	.07617 (3.44)***	-.00052 (- .77)	.00566 (2.36)**	.7319 (25)
C_1 Under 100,000	-14.72218 (-4.94)***	-.00104 (- .81)	.00038 (1.75)*	.00343 (1.93)*	.00174 (I.53)	.05040 (.51)	-.00100 (-2.58)**	.00724 (4.47)***	.6268 (55)
C_2 Over 100,000	- 7.71481 (-1.68)	-.00311 (-2.32)*	.00108 (2.58)**	-.00004 (-.01)	.00296 (1.79)	.05168 (2.41)*	-.00075 (-2.86)**	.00936 (3.89)***	.9023 (14)

$\bar{R}^2$ = Adjusted Coefficient of Multiple Determination

* = indicates significance at the .10 level (two-tailed test)
** = indicates significance at the .05 level (two-tailed test)
*** = indicates significance at the .01 level (two-tailed test)

is the only variable in which we obtain a sign different from that which we expected (model B_2 and C_2). However, the result is so highly insignificant in each of these that it can realistically be ignored. Of further interest though is the fact that the median age of the labour force yielded a significant effect in all of our "under" models. The percentage of the total population over 65 (X_5) provides us with a positive and expected relationship in all sub-models. This variable tends to be significant in only one, namely A_2.

The population variable (X_6) is significant in our models A_2, B_2, and C_2. It indicates that a greater degree of income inequality exists in the larger urban centres of which there are few in Ontario. Further support for such a fact is provided by Stone (29) and Lithwick (15). X_7 (the percentage of people employed in manufacturing related occupations) provides us with our hypothesized inverse relationship. It proves highly significant in all the "under" (A_1, B_1, C_1) models plus one of the "over" models (C_2). The percentage of people with a university degree (X_8) in each centre provides us with no surprises. It is statistically significant and positive in all our models, indicating that its effect is felt in much the same way in all places in our study.

A further way of viewing the results would be to rank the independent variables in terms of their relative importance in explaining variations in the dependent variable in each of the sub-models and then to compare our models. Table 4 provides us with this information. From it, one notices the

TABLE 4

BETA COEFFICIENTS

FOR THE SUB-MODELS

Variables	Sub-Models					
	A_1	B_1	C_1	A_2	B_2	C_2
X_1	-.574 (1)	-.589 (1)	-.673 (1)	-.426 (4)	-.384 (3)	-.601 (7)
X_2	.025 (7)	-.110 (8)	-.093 (7)	-.270 (6)	-.223 (6)	-.720 (5)
X_3	.289 (5)	.265 (5)	-.207 (5)	.479 (3)	.343 (5)	.756 (3)
X_4	.360 (4)	.278 (4)	.229 (4)	.103 (8)	-.060 (8)	-.006 (8)
X_5	.190 (6)	.261 (6)	.200 (6)	.348 (5)	.356 (4)	.624 (6)
X_6	.013 (8)	.138 (7)	.047 (8)	.553 (2)	.652 (1)	.733 (4)
X_7	-.467 (2)	-.395 (3)	-.267 (3)	-.207 (7)	-.190 (7)	-.788 (2)
X_8	.422 (3)	.577 (2)	.583 (2)	.674 (1)	.509 (2)	.867 (1)

Figures in parenthesis rank the independent variables in terms of their relative importance in explaining variations in the dependent variable in each of our sub-models.

high degree of similarity between the relative importance of the independent variables in models A_1, B_1, and C_1. Similar results hold for A_2, B_2, and C_2. However, there is considerable variation between A_1 and A_2, $B_1$and B_2, $C_1$and C_2; results which conform to our earlier statistics.

Conclusion:

On the basis of the above results, one may draw a few conclusions regarding city-to-city variations in income distribution. First, the rather simple model employed in this paper appears to be quite useful in accounting for a large percentage of the variation (over 70 percent with seven independent variables) in the concentration of family income in cities and towns in Ontario. In fact, Table A-2 (Appendix A) indicates that only one centre in our study came up with a residual which exceeded ten percent of the observed measure of income concentration; a result which is particularly impressive since our choice of a geographic area in which to conduct the analysis eliminates most of the factors found, in other studies, to be important in explaining the variation in income inequality. Although one may find other variables which contribute to a higher R^2 or a further significant independent variable, our study has adopted as its independent variables only those which it was felt on the basis of previous work or specific knowledge of the area could be justified as having an effect on income concentration. Second, the fact that we have been able to identify a number of factors within each

city which are most closely associated with this variation should prove useful for others contemplating further theoretical or empirical work on income distribution. Third, because of the nature of such a study on income distribution, one cannot make "specific" policy recommendations; for example, one cannot indicate the resultant effects of a change of ten percent in government expenditures or taxes or indeed some other specific policy variable. However, what this study has done is to point out the general areas in which the government may wish to make further investigations with respect to specific policy recommendations if one of the objectives of governmental policy is to lower the degree of income inequality which presently exists in cities and towns in Ontario.

APPENDIX A

TABLE A-1 - THE CORRELATION MATRIX OF THE DEPENDENT AND INDEPENDENT VARIABLES

(THE LAST COLUMN IS THE DEPENDENT VARIABLE)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	Y GINI
X_1	1.0000								
X_2	.0574	1.0000							
X_3	-.1667	-.1194	1.0000						
X_4	.0254	-.3045	-.4367	1.0000					
X_5	-.5613	.2192	-.2533	.2926	1.0000				
X_6	.1706	.3853	.2324	-.1155	-.0813	1.0000			
X_7	-.0341	.3250	.0274	-.1820	-.0326	.0937	1.0000		
X_8	.5829	.2807	-.1545	-.1223	-.2119	.3443	-.3002	1.0000	
Y (GINI)	-.3719	.0430	.1739	.1298	.4057	.3595	-.4379	.2502	1.0000

TABLE A-2

COMPARISON OF ACTUAL

AND ESTIMATED GINI COEFFICIENT 1971

MUNICIPALITY	ACTUAL	ESTIMATED	RESIDUAL AS A PERCENTAGE OF ACTUAL
Ajax	.2306	.2370	-2.77
Aurora	.2645	.2795	-5.68
Barrie	.3069	.3045	.78
Belleville	.3017	.3036	- .63
Brampton	.2660	.2520	5.27
Brantford	.2915	.2919	- .14
Brockville	.2970	.2994	- .81
Burlington	.2825	.2943	-4.18
Chatham	.3015	.2972	1.43
Cobourg	.2959	.2988	- .98
Cornwall	.3236	.3115	3.74
Dundas	.2999	.3143	-4.80
Fort Erie	.2952	.3043	-3.07
Galt	.2822	.2705	4.16
Georgetown	.2282	.2429	-6.44
Grimsby	.2749	.2945	-7.14
Guelph	.2909	.3061	-5.22
Hamilton	.2997	.3123	-4.20
Kapuskasing	.2843	.2873	-1.04
Kenora	.2922	.3151	-7.85
Kingston	.3316	.3341	- .75
Kitchener	.2847	.2783	2.25
Leamington	.3151	.3129	.71
Lincoln	.3209	.3275	-2.05
Lindsay	.3263	.3206	1.75
London	.3095	.3133	-1.24
Markham	.3141	.2928	6.79
Midland	.2999	.2970	.96
Mississauga	.2810	.2759	1.81
Newmarket	.2688	.2752	-2.37
Niagara Falls	.2899	.3052	-5.26

MUNICIPALITY	ACTUAL	ESTIMATED	RESIDUAL AS A PERCENTAGE OF ACTUAL
Niagara-on-the-Lake	.3292	.3136	4.67
North Bay	.2976	.3067	-3.05
Oakville	.2931	.2866	2.23
Orillia	.3288	.3178	3.36
Oshawa	.3015	.2797	7.22
Ottawa	.3328	.3088	7.20
Owen Sound	.3153	.3115	1.22
Pembroke	.3469	.3353	3.34
Peterborough	.3076	.3021	1.80
Port Colborne	.2857	.2974	-4.11
Preston	.2904	.2691	7.34
Richmond Hill	.2669	.2724	-2.07
St. Catherines	.3093	.3076	.54
St. Thomas	.2935	.2871	2.18
Sarnia	.2747	.2978	-8.41
Sault St. Marie	.2817	.2803	.50
Simcoe	.3294	.3110	5.60
Stratford	.2967	.2952	.52
Sudbury	.2970	.2883	2.93
Thorold	.2665	.2896	-8.67
Thunder Bay	.2988	.3108	-4.03
Timmins	.3382	.3193	5.59
Toronto	.3856	.3842	.37
Etobicoke	.3017	.2938	2.61
Scarborough	.2678	.2825	-5.48
York	.3024	.3022	.05
York East	.2963	.3060	-3.28
York North	.3304	.3285	.59
Trenton	.2868	.2901	-1.16

Vanier	.2835	.3002	-5.89
Vaughan	.3389	.3038	10.36
Wallaceburg	.2898	.2803	3.27
Waterloo	.3168	.3096	2.29
Welland	.3048	.2951	3.19
Whitby	.2899	.2792	3.71
Whitchurch - Stouffville	.3221	.2907	9.75
Windsor	.3121	.2994	4.05
Woodstock	.2896	.2897	- .05

Mean Actual Gini = .2993

Standard Deviation of Gini = .0249

TABLE A-3 - DATA AND SOURCES, BY CITY AND TOWN FOR ONTARIO, 1971

	Gini Ineq. Ratio [a]	Median Fam. Icome (Dollars) [b]	Percentage Female Partici-pation Rate [c]	Percent of Pop. in Ethnic Group [d]	Median Age of the Labour Force (Years) [e]	Percentage of Pop Over 65 Years Old [f]	Pop. Size [g]	Percentage of Labour Force Employed in Manufacturing [h]	Percentage of Pop. with Univ. Degree [i]
	Y	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
Ajax	.2306	11,441	23.16	5.63	34.21	3.40	12,515	44.82	3.08
Aurora	.2645	10,926	21.15	2.39	35.72	6.40	13,614	34.86	4.98
Barrie	.3069	9,363	22.49	3.13	35.11	9.70	27,676	32.40	4.52
Belleville	.3017	9,401	23.70	3.37	35.97	9.01	35,128	34.39	4.50
Brampton	.2660	11,151	24.69	8.96	33.65	4.89	41,211	44.39	4.14
Brantford	.2915	8,839	23.42	8.40	35.79	10.29	64,421	46.07	2.69
Brockville	.2970	9,762	25.11	2.76	36.44	9.36	19,765	38.64	5.20
Burlington	.2825	11,751	20.36	5.66	35.41	5.00	87,023	33.45	8.09
Chatham	.3015	9,416	22.31	6.67	34.74	10.28	35,317	35.79	3.82
Cobourg	.2959	9,229	21.98	2.83	35.35	11.93	11,282	38.20	3.72
Cornwall	.3236	8,280	20.53	33.12	34.24	8.69	47,116	39.10	2.90
Dundas	.2999	10,920	20.24	3.95	36.32	10.17	17,208	35.64	8.50
Fort Erie	.2952	9,163	20.99	5.54	37.65	9.86	23,113	35.17	2.80
Galt	.2822	9,091	24.73	13.58	34.07	8.25	38,897	52.70	2.69
Georgetown	.2282	11,372	22.39	4.55	33.69	3.96	17,053	44.39	3.84
Grimsby	.2749	10,146	19.39	7.20	35.38	8.81	15,770	34.74	4.64
Guelph	.2909	9,764	23.88	8.97	33.86	8.44	60,087	37.05	6.75
Hamilton	.2997	9,209	21.50	17.34	35.53	9.50	309,173	42.93	3.15
Kapuskasing	.2843	10,246	15.50	57.10	32.71	5.14	12,834	36.38	2.89

TABLE A-3 (Continued)

Kenora	.2922	9,620	20.80	8.65	37.01	10.46	10,952	26.64	3.96
Kingston	.3316	9,122	24.73	6.87	32.92	9.54	59,047	26.57	8.33
Kitchener	.2847	9,829	25.66	13.36	33.09	7.46	111,804	44.95	4.19
Leamington	.3151	8,905	22.88	27.78	36.69	15.10	10,435	38.67	1.89
Lincoln	.3209	8,544	18.78	13.05	37.27	11.55	12,247	27.41	2.86
Lindsay	.3263	8,248	23.31	2.15	36.04	14.08	12,746	35.46	3.68
London	.3095	9,901	25.41	7.62	34.01	8.27	223,222	34.83	6.35
Markham	.3141	12,859	20.80	4.96	36.66	5.63	36,684	29.59	9.04
Midland	.2999	8,577	22.31	4.96	34.84	10.28	10,992	39.22	3.02
Mississauga	.2810	11,912	23.34	9.50	33.97	3.35	156,070	38.52	7.17
Newmarket	.2688	10,391	26.33	2.98	33.99	10.55	18,941	36.68	3.73
Niagara Falls	.2899	9,243	22.02	12.69	36.54	9.31	67,163	35.17	3.05
Niagara-on-the Lake	.3292	9,124	21.28	17.37	36.25	8.88	12,552	30.44	3.70
North Bay	.2976	9,453	21.08	14.60	34.96	6.67	49,187	26.85	3.96
Oakville	.2931	11,837	22.25	9.28	36.07	4.72	61,483	36.83	7.52
Orillia	.3288	8,412	20.92	3.94	35.64	10.42	24,040	31.05	3.73
Oshawa	.3015	9,329	20.99	10.66	34.14	6.61	91,587	45.50	3.17
Ottawa	.3328	10,992	25.95	23.74	34.74	8.78	302,341	32.52	5.05
Owen Sound	.3153	8,620	23.56	1.36	35.58	12.94	18,469	34.71	3.56
Pembroke	.3469	7,785	22.06	7.85	36.16	11.28	16,544	26.86	3.74
Peterborough	.3076	9,700	22.38	2.20	35.55	9.59	58,111	37.65	5.21
Port Colborne	.2857	9,059	18.68	15.79	36.57	8.80	21,420	40.42	2.50
Preston	.2904	9,028	24.57	6.84	33.76	8.88	16,723	50.07	2.60
Richmond Hill	.2669	11,003	22.76	6.09	36.77	5.71	32,384	35.84	3.55
St. Catharines	.3093	9,124	19.70	12.03	35.98	8.31	109,722	39.48	3.94
St Thomas	.2935	9,195	23.15	4.35	33.96	12.06	25,545	38.58	2.63
Sarnia	.2747	10,973	20.77	8.13	35.43	7.03	57,644	31.78	6.37
Sault Ste Marie	.2817	10,042	19.14	14.78	34.35	5.90	80,332	39.16	3.36

TABLE A-4 (Continued)

Simcoe	.3294	9,307	22.92	4.44	35.42	11.90	10,793	33.83	4.87
Stratford	.2967	9,123	24.34	4.21	34.96	11.63	24,508	42.74	4.00
Sudbury	.2970	10,945	19.42	32.36	32.51	4.97	90,535	27.67	4.44
Thorold	.2665	8,879	19.48	16.28	36.97	8.00	15,065	45.77	1.97
Thunder Bay	.2988	9,459	20.48	13.99	36.29	9.09	108,411	32.53	3.47
Timmins	.3382	8,139	17.49	45.87	34.91	1.56	28,542	26.92	2.51
Toronto	.3856	8,600	27.04	31.88	33.73	10.99	712,786	37.58	7.79
Etobicoke	.3017	11,899	24.58	13.50	37.24	6.75	282,686	42.96	6.24
Scarborough	.2678	11,090	24.86	10.12	35.85	5.21	334,310	42.16	3.91
York	.3024	8,972	26.39	37.55	34.47	8.67	147,301	46.07	3.11
York East	.2963	10,110	28.58	17.50	35.00	12.53	104,784	43.26	5.95
York North	.3304	11,229	24.80	19.96	35.01	5.97	504,150	37.69	8.11
Trenton	.2868	8,609	21.19	3.42	35.11	6.92	14,589	36.66	2.46
Vanier	.2835	8,876	25.13	64.75	29.98	5.78	22,477	38.33	3.97
Vaughan	.3389	11,746	20.40	7.43	38.36	7.91	15,873	30.41	6.99
Wallaceburg	.2898	8,695	21.95	14.23	36.05	9.29	10,550	51.37	1.71
Waterloo	.3168	10,363	24.46	9.54	32.26	5.92	36,677	37.43	10.34
Welland	.3048	9,142	19.14	25.54	35.53	8.61	44,397	45.06	2.86
Whitby	.2899	9,892	20.06	5.37	36.05	6.35	25,324	39.99	3.18
Whitchurch Stouffville	.3221	9,789	19.25	2.53	36.00	9.33	11,217	31.56	2.73
Windsor	.3121	10,430	20.56	16.00	34.91	10.03	203,300	38.66	4.17
Woodstock	.2896	9,424	22.70	5.92	35.32	10.62	26,173	42.54	3.58

a Calculated from data taken from unpublished data, Census of Canada, 1971, "Census Family Income By Urban Centers of 10,000 or more", Information Canada, Ottawa, 1974.

b Calculated from Census of Canada, 1971, "Census Family Income by Urban Centers of 10,000 or More", Information Canada, Ottawa, 1974.

c Calculated from unpublished data, Census of Canada, 1971, "Individuals 15 Years and Over, Labour Force Activity by Level of Schooling, by Sex, and by Age Groups", Information Canada, Ottawa, 1974.

d Calculated from Census of Canada, 1971, "Population: Official Language and Language Most Often Spoken at Home, Catalogue 92-726", Information Canada, Ottawa, 1973.

e Calculated from unpublished data, Census of Canada, 1971, "Individuals 15 Years and Over, Labour Force Activity by Level of Schooling, by Sex, and Age Groups", Information Canada, Ottawa, 1974.

f Calculated from, Census of Canada, 1971, "Population: Age Groups, Catalogue 92-715", Information Canada, Ottawa, 1973.

g From Census of Canada, 1971, "Population of Urban Centres of 5,000 and Over, Catalogue 92-754", Information Canada, 19--.

h Calculated from, Census of Canada, 1971, "Experienced Labour Force by Occupation by Census Subdivisions of Ontario", Information Canada, Ottawa, 1974.

i Calculated from Census of Canada, 1971, "Population by School Attendance and Schooling, Catalogue 92-720", Information Canada, 1974.

Bibliography

1. Adams, Ian, et al., The Real Poverty Report, Edmonton, 1972

2. Aigner, D.J. and Heins, A.J., "On the Determinants of Income Equality", American Economic Review, Vol. 57, 1967, pp. 175-184.

3. Al-Sumarrie, Ahmad and Miller, H.P., "State Differentials in Income Concentration", American Economic Review, Vol. 57, 1967, pp. 59-72.

4. Becker, Gary S., Human Capital and the Personal Distribution of Income: An Analytical Approach, Ann Arbor, Michigan Institute of Public Administration, 1967.

5. Bowley, Arthur Lyon, Wages and Income in the United Kindgom Since 1960, Cambridge: The University Press, 1937.

6. Bronfenbrenner, Martin, Income Distribution Theory, New York: Aldine-Atherton, 1971, pp. 386-444.

7. Conlisk, John, "Some Cross-State Evidence on Income Inequality", Review of Economics and Statistics, Vol. 49, 1967, pp. 115-118.

8. Eckstein, O. and Wilson, T.A., "The Determination of Money Wages in American Industry", Quarterley Journal of Economics Vol. 76, 1962, pp. 379-414.

9. Econometric Study of Incomes of Canadian Families, 1967, Information Canada, Ottawa, 1972.

10. Farbman, Michael, "Income Concentration in the Southern United States", Review of Economics and Statistics, Vol. LV, No. 3, August 1973, pp.333-340.

11. Fitzwilliams, J.M. "Size Distribution of Income in 1963", Survey of Current Business, 44 (April 1964), pp. 3-11.

12. Jonish, James E. and Kau, James B., "State Differentials in Income Inequality", Review of Social Economy, Vol. 31, 1973, pp. 179-190.

13. Kravis, I.B., "International Comparison of Income Size Distriubtion", Review of Economics and Statistics, Nov. 1960, 42, pp. 408-16.

14. Kuznets, Simon, "Economic Growth and Income Inequality", American Economic Review, Vol. XLV, March 1955, pp. 1-28.

15. Lithwick, N. Harvey, Urban Canada, Problems and Prospects, Central Mortgage and Housing Corporation, Ottawa, Canada, December 1970.

16. Lithwick, N. Harvey, Urban Poverty, reserach monograph 1, Central Mortgage and Housing Corporation, Ottawa, Canada, January 1971.

17. Mills, Edwin S., Urban Economics, Scott, Foresman and Company, Illinois.

18. Mincer, J., "Investment in Human Capital and the Personal Distribution of Income", Journal of Political Economy, August 1958, 66, pp. 281-302.

19. Morgan, James, "The Anatomy of Income Distribution", Review of Economics and Statistics, August 1962, 44, pp. 270-83.

20. Murray, Barbara, "Metropolitan Interpersonal Income Inequality", Land Economics, pp. 121-125.

21. Oshima, H.T., "International Comparison of Size Distribution of Family Money Income with Special Reference to Asia", Review of Economics and Statistics, November 1962, 44, pp. 439-45.

22. Ostry, Sylvia, Unemployment in Canada, Ottawa, 1968.

23. Podoluk, Jenny R., Incomes of Canadians, D.B.S., Ottawa, 1968.

24. Porter, John, The Vertical Mosaic, University of Toronto Press, Toronto, 1965.

25. Poverty in Canada, Report of the Special Senate Committee on Poverty, Ottawa, 1971.

26. Reder, M., "A Partial Survey of the Theory of Income Size Distribution", in Six Papers on the Size Distribution of Wealth and Income, ed. Lee Soltow, New York: National Bureau of Economic Research, 1969, p. 231.

27. Sale, T. S., "Interstate Analysis of the Size Distribution of Family Income, 1950-70", Southern Economic Journal, Vol. 40, No. 3, January 1974, pp. 434-441.

28. Soltow, L., "The Distribution of Income Related to Changes in The Distribution of Education, Age and Occupation", Review of Economics and Statistics, 42, November 1960, pp. 450-453.

29. Stone, Leroy O., Migration in Canada: Regional Aspect, D.B.S., 1961, Census Monograph, 1969.

30. Thompson, Wilbur R., "The Economic Base of Urban Problems", in N.W. Chamberlain (ed.), Contemporary Economic Issues, R.D. Irwin, 1969.

31. Williamson, J.G., "Regional Inequality and the Process of National Development: A Description of the Patterns" Economic Development and Cultural Change, 13 July 1965, 3-84.